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Wide-field subsecond temporal resolution optical monitoring systems for the detection and study of cosmic hazards

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Abstract

The possibility of using multi-objective optical telescopes equipped with detectors with high time resolution is studied. Two types of instruments with six and nine channels are considered here, which include the standard high-aperture objectives with small diameters, panoramic detectors with high time resolution, and equatorial mounts. The instruments function in two regimes, the monitoring mode and the follow-up mode in which all objectives observe one field with a rapidly moving celestial object detected by monitoring. Using the FAVOR and TORTORA cameras moving satellites and meteors of 9-10 stellar magnitudes in brightness were registered. The positive experience acquired from the exploitation of the FAVOR and TORTORA systems led to awareness of the need to further develop the wide-field technique to search for fast optical transients. The main result of the realization of the project will be the construction of a new type of instrument to discover and study rapidly variable optical sources with a priori unknown location.

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